

Finnish Safety and Chemicals Agency (Tukes)

Timo Talvitie | 14 June 2017

Remote operated production plants - Safety concerns

The logo for Tukes, the Finnish Safety and Chemicals Agency, is displayed in a white, rounded, sans-serif font. The letters are thick and have a slightly irregular, hand-drawn feel. The logo is centered within a teal-colored rectangular area that has a subtle gradient from light to dark.

Finnish Safety and Chemicals Agency

Offices: Helsinki, Tampere, Rovaniemi

Personnel: 258

Industry department – Industrial processes unit

- 15 employees
- Core duty: inspection of and granting licenses for production plants that handle or store hazardous chemicals or explosives
- Competent Authority on SEVESO-directive

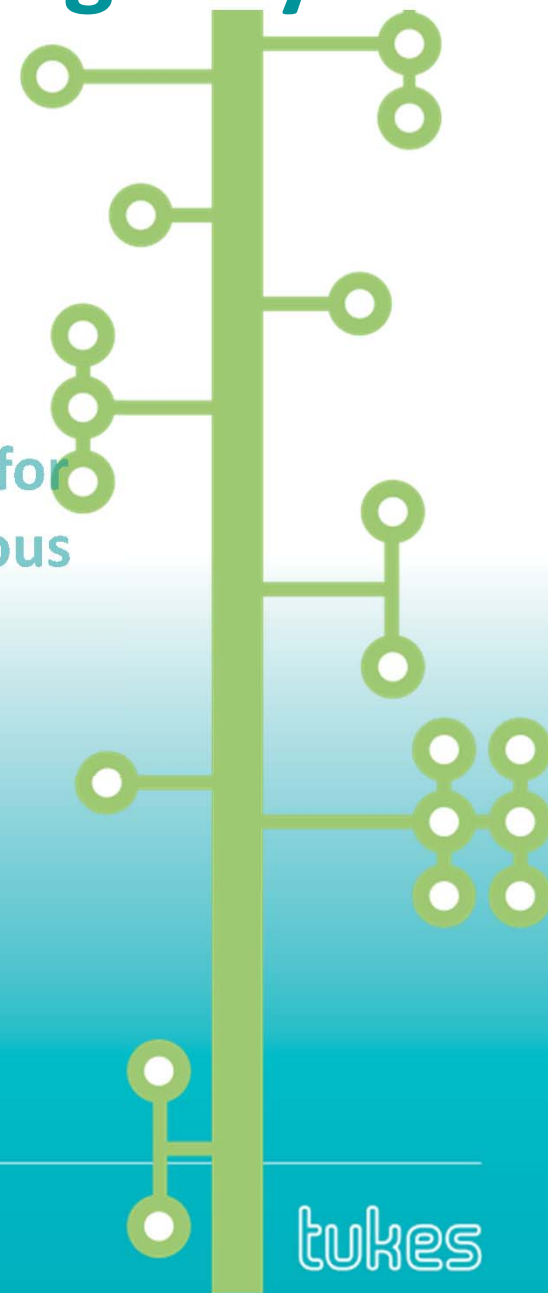
VISION

**Responsible, safe and
COMPETITIVE Finland**

– Tukes is a builder of cooperation, pointing the way forward.

SUOJAN TUOJA.

tukes



Unmanned and remote operated production plants – safety concerns

- Case where Tukes licensed a hydrogen production plant
 - Fire and explosion risks as well as toxic release
 - Remote operated, unmanned
- A growing trend
 - Air separation plants
 - Small heating plants (operated only on reserve and peak times) using LPG as a fuel

The hydrogen plant

- Hydrogen production by steam methane reforming
 - Takes place in the reformer at 900 °C, where the natural gas / steam mixture passes the catalyst
 - Products: hydrogen (and carbon dioxide) delivered through a pipeline to a close-by oil refinery
- Capacity: 45 000 Nm³ H₂/h, corresponds to 4 tn/h
- Maximum amount of chemicals:
CH₄ = 1.5 t, H₂ = 0.8 t, CO = 0.7 t
 - Under the Seveso establishment but still licensed by Tukes (national legislation)
- The plant is constructed for remote operation and is unmanned outside regular office hours
 - Remote control center located in Germany

The licensing process in Finland

- A company submits a licence application including hazops, consequence analysis, safety system documents etc. to Tukes
 - Handling takes 4-8 months on average → Tukes give a licence with conditions and before commissioning a plant has to be inspected by Tukes
 - The company proposed that the local operator would be in the site within one hour if needed. Otherwise an employee can be reached by phone.
 - The hydrogen plant got the licence on the condition that:
 - The local operator or an emergency on-call person has to be at the site no later than 15 minutes
 - Main reasons for the condition were the major accident hazards (fire and explosion) and the need of expert support to the local fire department
- The company took the decision to court!

Decision of the Finnish administrative court

- The court rejected the company's appeal to overrule the demand of 15 minutes response time for the emergency on-call person
 - The court also added that it was not necessary for the on-call person to be on the payroll of the company but this service could also be bought outside the company
 - Tukes had to handle the condition in the license again
- Before the court decision took place the company decided to hire three new field operators (24/7 crew) and the plant started its operations and the plant was commissioned

Safety concerns for the remote operated unmanned plants

- Which risks can be managed remote and which not?
 - Major accident scenarios?
- What are the requirements for changing the plant from a locally operated plant to a remote operated one? Level of automation?
- How many and how complex plants can the same remote operator(s) control?
 - How to inspect the remote control center aboard
- Precautionary actions needed if the remote connection or power is lost?
- Response time for the local personnel or emergency on-call persons?
- Operator's ability to control the plant manually or react to different unusual situations
- Good practices for remote operated plants?
- Open questions: cyber risks..



Thank you for your attention!

www.tukes.fi

www.facebook.com/turvallisuusjakemikaalivirasto

www.twitter.com/tukesinfo

tukes

